L. Malassis

Economic development and the programming of rural education

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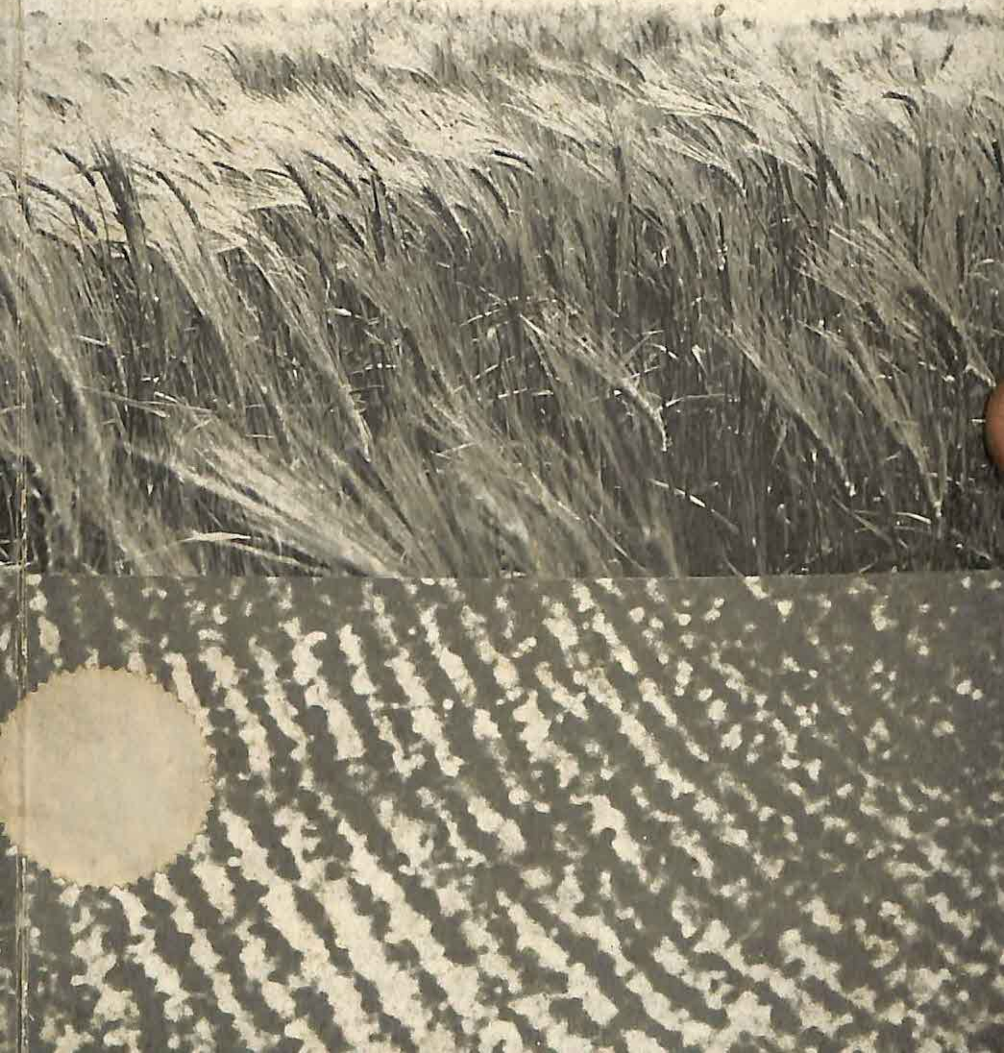

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Economic development and the programming of rural education

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L. Malassis

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Bureau Edn. [illegible] Research
DAVID [illegible] COLLEGE
Dated 15. 3. 69
No 2031

Published in 1966 by the United Nations
Educational, Scientific and Cultural Organization
Place de Fontenoy, Paris-7e
Printed by Akadémiai Nyomda, Budapest

© Unesco 1966. *Printed in Hungary.* APS.66/D.41/A

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Foreword

Education, in the widest meaning of the term, lies at the heart of development. But education and development are continuing long-term processes which require careful planning if the improved conditions of life that they are expected to bring about can be realized. The training of the skilled people needed for industrial and agricultural development must be planned from the start and continuously carried on as the economy expands. And since such training requires a broad base of general education, full account has to be taken of the relationship between general and technical education, and of such major obstacles to development as illiteracy.

Education in rural areas and the application of science to rural and agricultural development has been a major concern of Unesco from its earliest days, since one of the most urgent problems facing developing countries in particular is the serious shortage of educated and trained personnel, at all levels of proficiency – a shortage which is especially acute with regard to personnel trained for agricultural development. Study of this problem has been stimulated by the efforts of many Member States in the last decade to expand education, including technical and agricultural education. Such efforts have required the establishment of long-term plans based upon the study of human resources in relation to economic and social development. The present document on the methodology of such studies, with reference to the rural and agricultural sector, is based upon the analysis of previous work in educational planning for agriculture in various countries, and on a systematic investigation of the methodology at present being applied.

It is hoped that this booklet will be useful to all those engaged in the planning and development of education in relation to rural and agricultural development, and to scientists, teachers and administrators.

The author has been left free to express his own views, which are not necessarily those of Unesco.

Introduction

This paper is a tentative essay, though it has benefited from work by the author under the Organization for Economic Co-operation and Development (OECD)[1] and from his observations during a number of missions in developing countries.[2] Preliminary notes were drafted and circulated to the seminars on agricultural education and vocational training organized by the Food and Agriculture Organization (FAO) in co-operation with the International Labour Organisation (ILO) and Unesco, and to a number of Unesco experts and correspondents. The author extends his most sincere thanks to those organizations and experts who have favoured him with constructive observations and suggestions. It is his hope that his paper will elicit further comments which could contribute to working out the principles for rural education as an integral part of over-all programmes for economic and social development.

The method adopted for this paper is that of the 'global approach'. Rural development is considered in the context of over-all economic growth and agricultural education in reference to the educational system considered as a whole. The end in view is 'rounded' development, which means the inclusion of the rural community and a visualizing of the training and education in terms of the whole younger generation in the developing countries.

An important factor of recent work in economics is its having introduced 'education' into the theory of economic growth, i.e., its having considered the aims, structures, methods and means of education as instruments of economic growth.

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[1] L. Malassis, *Intellectual Investment in Agriculture for Economic and Social Development*, Paris, 1962. (OECD Documentation in Agriculture and Food.)

[2] Cambodia, Egypt, Ivory Coast, Madagascar, Morocco, Nigeria, Senegal, Tunisia.

In this perspective a whole series of studies similar to those commonly carried out by economists in connexion with material investments can be envisaged: classification of the different forms of intellectual investment, estimates of expected productivity rates and fixing of priorities, the proportion of the national revenue to be devoted to education, relations between the rate of development of education and the growth rate, etc. Calculations of this kind, however, run into many difficulties: the methodology has not been sufficiently worked out and the basic data are sadly inadequate.

Moreover, such calculations are of limited significance. The fact is that education has a dual role: it increases productive capacity; it contributes to the fulfilment of the individual's potential and satisfies his need to know and explain.

Most often education is at once a form of investment and a form of consumption, and this dual aspect of education, as an instrument for economic development and as an agency for personal improvement must never be forgotten. At the same time, the distinction between investment education and consumption education is extremely helpful in characterizing trends of thinking or types of training.[1] Professor Edding has rightly emphasized that misunderstandings might arise between economists and educators and that it is necessary to avoid them by starting a collation process with a view to reaching a synthesis between the theory and practice of education and of economics. It is by combining educators, sociologists, economists and statisticians that we are most likely to arrive at a set of practicable principles for an educational system which ties in with the economic and social objectives of growth.

The 'expenditure on education' which contributes to the raising of the individual's productive capacity and to his fuller individual development comprises several forms of expense.

A handy way of writing this is to say that the expenditure (De = *dépenses*)[2] equals the sums allocated to research (R), schooling (E = *enseignement*), information (V), adult occupational training (P = *promotion des adultes*) and a collection of educational 'activities' inviting joint action or action for particular ends (youth movements, co-operatives, cultural centres, etc.) which we can call 'other forms' *(AF = autres formes)*, giving us:

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[1] This distinction was drawn by W. A. Lewis.

[2] The original manuscript is in French, which accounts for the symbols used and the explanations given in parentheses.

$$De = R + E + V + P + AF. \tag{1}$$

This presentation is convenient, but as soon as we seek to detail the content of each of these forms of expenditure, to fix boundaries, to estimate the total expenses, etc., we come up against many difficulties. None the less, the formula can guide our thinking: it suggests the notion of a 'system of intellectual investments', of interdependence and co-ordination, of programming and organized development, etc.

A number of studies are now available in Europe on the development of education in relation to economic growth.[1]

Certain basic trends may be singled out:

1. As a given society becomes richer, it spends proportionately more on education (Professor Svennilsen). '. . . the educational approach must . . . by its very nature take fully into account that education is both a means of expending economic activity and an end towards which economic activity is directed. The two aims must be related if neither the individual nor the citizen is to be neglected in a technological society.'[2]
2. While expanding, the educational system is at the same time changing its structures, programmes and methods (Professor Edding).
3. Marked disparities in educational levels (scales of education and development) exist between the nations and, in the same nation, between zones (rural and urban), between sectors of production (agriculture and other sectors) and between the social classes.

These considerations and others indicate that the educational system is a historical 'category' determined by the phases of economic growth and a geographical 'category' determined by national traditions, by the socio-political philosophy of the different peoples and by their evaluation of the role of education in growth.

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[1] OECD, *Policy Conference on Economic Growth and Investment in Education*, Washington, 16-20 October 1961 (five volumes).

[2] Unesco, *Education and Agricultural Development*, Paris 1964, p. 16. (Freedom from Hunger Campaign. Basic Study No. 15.)

While the particular studies on education in relation to economic growth prove fairly rich in inferences, synoptic studies on intellectual investments are still relatively rare, though the role of scientific development in general and of research as a growth-impelling activity has been the subject of some economic analyses in the last few years.[1]

Surveys of intellectual investment in relation to rural development are even rarer and this situation calls for thought, the more so as twentieth-century agricultural growth in Europe has been founded on a twin process embracing concurrently capital accumulation and the increase of knowledge. In Europe, as in the United States, the areas under cultivation and the numbers employed in agriculture have both shrunk considerably, whereas agricultural production has considerably increased. It follows, therefore, that accumulation and circulation of knowledge have been a fundamental factor in agricultural growth in the advanced countries.[2]

Agriculturalists are getting benefits directly or indirectly from the global expenditure on all kinds of fundamental research, training and information, etc. None the less, the necessity of organizing a system of intellectual investments to meet certain needs specific to the agricultural sector is everywhere recognized. The proportion of 'agricultural' to 'total' research, training and information, like the administrative structures and the authorities responsible for specific services, varies from country to country with the differences in their histories and social philosophies. But, in every instance, the efficiency of the agricultural intellectual investment's system depends on the size and efficiency of the educational system as a whole and on the relations between the two. In the more advanced countries, both on considerations of efficiency and to satisfy the aspirations of the farming population, agricultural education is being increasingly integrated with the general system of education.

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1. OECD, *Science, Economic Growth and Government Policy*, Paris, 1963.
2. OECD, *Intellectual Investment in Agriculture for Economic and Social Development*, Paris, 1962, p. 151. (Report by Professor Malassis.)

The expression used to represent the different forms of 'education' (I) can also be used to express that expenditure specific to the agricultural sector:

$$I_a = R_a + E_a + V_a + P_a + AF_a \,. \qquad (2)$$

However, thinking in broader terms and to make it clear that agricultural education is the product at once of a general education and of instruction in agriculture, Unesco[1] has suggested a revised expression:

$$I_a = R_{g+a} + E_{g+a} + V_{g+a} + P_{g+a} + AF_{g+a} \,. \qquad (3)$$

We shall revert to this expression for discussion in connexion with the developing countries, but it must be made clear now that the relative magnitude of the 'general' (g) component in the 'agricultural' (a) system of education tends to increase with greater economic and social development. Further, each of the forms of intellectual investment presents features specific to the sector which have been discussed in another publication.[2]

The total of expenditure on intellectual investment in agriculture differs from country to country. It is not in those countries where the agricultural sector is relatively the most important that the expenditure of public money for that sector is relatively highest, but in the highly industrialized countries.

Industrialization and the rise in revenue which goes with it promote increased intellectual investment in agriculture, but on either side of the 'mean' there are wide deviations according to the particular peoples' willingness to develop rural and agricultural education.

While the 'European model' may provide a valuable lead for thinking and action, it is nevertheless not transposable to the developing countries. A specific model, or rather several specific models, must be devised in relation to the phases of development (historical 'categories') and the traditions and socio-political philosophies of the nations concerned (geographical 'categories').

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[1] Division of Applied Social Sciences, Unesco. Private communication.

[2] OECD, *Intellectual Investment in Agriculture for Economic and Social Development*, op. cit.

In the present study some aspects of the relations between education and economic development will be discussed and a line of approval will be propounded for the programming of rural education in developing countries.

Education and rural development

General characteristics of underdevelopment

While each developing country presents its own specific characteristics, there are also certain general characteristics of economic underdevelopment, which in the rural sector – the most important sector in the developing countries – are usually hypertrophical. They are: shortage of skilled manpower; under-employment and labour/land imbalance; incoherent socio-economic organization of production (with the subsistence sector predominating); incommensurateness of institutions (products of historical processes) with the necessities of rural development; lack of capital; inadequacy of the infrastructure; diversity of authorities, etc.

Additionally to these difficulties, there are others connected with the natural environment or the faulty jointing of production systems (e.g., separation of agriculture and stock-raising). The result is a low-efficiency agricultural economy with very low standards of living among agriculturalists; and in this sector the fundamental aims of a humane economy – the provision of food, of training and information, and of medical care and emancipation – are achieved even less adequately than in the others.[1]

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[1] F. Perroux, *La Coexistence Pacifique*, Paris, Presses Universitaires de France, 1958.

Acceleration of economic growth and rural development

Conditions for the acceleration of growth

The developing countries want to accelerate their rate of growth but the requirements for growth acceleration are manifold. In particular, it involves reducing the level of under-employment, notably by converting the available manpower into a productive investment, a higher rate of savings, a policy of investment priorities directed to exploring and harnessing the country's human and material resources, and a twin process of building up knowledge and capital resources.

'. . . perhaps the most common factor in the roster of problems facing underdeveloped countries is the acute shortage of educated and trained personnel at all levels of proficiency, and in every field of enterprise.'[1] There is a lack of university-level personnel – engineers, doctors, agronomists, and veterinary surgeons – of technicians, nurses, and middle-level cadres of teachers at all levels, of industrialists and agricultural estate operators, etc. The shortage of cadres, particularly at the highest levels, can doubtless be palliated temporarily through the machinery of bilateral or multilateral technical assistance but an essential aspect of a long-term growth policy is the training of the cadres and skilled manpower needed for such growth.

In agriculture, the shortage of trained personnel is in fact more serious than in the other sectors of the economy.[2]

The proportion of students taking agronomics is usually very low; there is a serious short-fall in the number of agricultural technicians trained; and the bulk of the illiterates are peasants. This is the more regrettable in that the developing countries are agricultural nations, that the distribution maps of illiteracy and malnutrition coincide, that hand in hand with the shortage of skilled personnel goes shortage of food and 'the combined effect of both these shortages is sharply dramatic against the primarily agricultural nature of these countries' economies'.[1]

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[1] Unesco, *Education and Agricultural Development*, op. cit., p. 13.

[2] Unesco, *Education and Agricultural Development*, op. cit., p. 13. OECD, *Policy Conference on Economic Growth and Investment in Education*, op. cit.

The role of agriculture in economic growth

By way of ensuring their growth, the developing countries tend to resort to industrialization. This is usually sound although in certain cases the real corner-stone of a country's over-all growth may be the growth of its agriculture and, in all cases, over-all growth necessitates the modernization of agriculture and the improvement of its productivity.[2]

Economists consider that agriculture has a triple part to play in over-all growth: (a) providing the workers necessary to the expansion of the non-agricultural sectors; (b) providing savings (agriculture is a financing rather than an investment sector); (c) increasing its productivity in order to raise the level of nutrition, expand exports (foreign currency), reduce imports, provide the basis for the development of the food processing and agricultural industries and prevent inflationary movements.

Everything indicates that economic growth implies increased agricultural production. As Arthur Lewis has pointed out, if agriculture is bogged down, it offers only a stagnant market and is a brake on the development of the rest of the economy. If the development of agriculture is neglected, it becomes more difficult to develop anything else. This is the basic principle of balanced growth.[3]

Essential though it may be, rural development none the less runs into many difficulties connected either with the natural conditions under which farming is carried on or its historical background or sometimes with conditions which have arisen or become accentuated in the young nations since they achieved independence.

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[1] Unesco, *Education and Agricultural Development*, op. cit., p. 14.

[2] Frederick H. Harbison, Human Resources Development Planning in Modernizing Economies, *International Labour Review*, May 1962.

[3] *Reflections on the Economic Problem*, Oxford, September 1961.

The process of agricultural growth

Analysis of the global function of agricultural production in relation to the exigencies of global economic growth and of the resulting intersector transfers enables the main factors of agricultural growth to be described.

The final agricultural product (P) of a given economic unit is determined by the areas under cultivation (S = *superficies)*, the effective agricultural work done (T = *travail)*, the permanent capital held in the form of physical facilities for production and livestock (C), and the regular purchases made by the agricultural sector in other sectors of the economy (fertilizers, insecticides, etc.) (Ac = *achats)*, so that we can conveniently express it:

$$P = f(S, T, C, Ac) .$$

This 'blackboard schema' enables various procedures for agricultural growth to be propounded: 'extensive' growth (expansion of cultivated land), growth by labour intensive reform, by changing the land-working systems and the 'man/acre' ratio for better utilization of the available labour potential, growth by capital, intensive reform, by land improvement, adoption of tools and machines permitting of increased production, intensified use of fertilizers (construction of factories), etc., or by a combination of these different procedures.

But agricultural growth does not come solely from more intensive exploitation of the factors of agricultural production but also from sounder exploitation of those which are traditional and the creation of new production methods and media – in other words, from a growth in land and labour productivity and in efficient use of the capital invested and, more generally, from a growth in the global productivity of all these factors combined which is the measure of technical progress.

The role of technical progress in agricultural growth

Since agricultural growth really started in Western Europe (roughly 130 years ago), production has more than tripled in volume with the population of Western Europe attaining a very high level of food consumption, but the rise in the productive capacity of agriculture outdistancing the growth in demand. A progressively smaller percentage of the whole population is employed in agriculture and a progressively larger percentage in catering for Western Europe's other material and intellectual wants. Over the period in question, the productivity of land has been increased three or four times over, while preserving soil fertility. The same is true of the productivity of agricultural labour which, of later years, has even grown at a rate which is frequently higher than that for the productivity of non-agricultural labour. This bears out S. Kuznets' observation that, as an economy develops, the productivity of labour tends to increase more rapidly in agriculture than in the other sectors of the economy. Numerous evaluations are available which can serve to demonstrate the part played by technical progress in over-all growth[1] and, more specifically, by technical progress in the farming sector in agricultural growth.[2] Estimates worked out in Japan indicate that, for the period 1880–1938, the return on the investments made in the form of research, education and agricultural extension services has been at the rate of some 35 per cent.[3] The indications are that technical progress in agriculture is itself directly linked to the development of rural education; this point must, however, be discussed.

'Timing' of rural education

The basic problem is to decide whether rural education is a cause rather than a consequence of growth; T. W. Schultz[4] has dealt specially with this point. The history of industrial growth demonstrates that it got under way without any substantial preliminary 'intellectual investment' and the decline in illiteracy followed rather than preceded it.[5] The history of agricultural growth likewise shows that growth is not necessarily bound up with increased 'intellectual investments' in agriculture, more especially when it

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1. OECD, *The Residual Factor and Economic Growth*, Paris, 1964, 279 pp.
2. T. W. Schultz, 'Education and Economic Growth's in: *Yearbook of the National Society for the Study of Education, 1961*.
3. A. M. Tang, 'Research and Education in Japanese Agricultural Development—1886–1938', *Eco. Study. Quat.* (quoted by T. W. Schultz).
4. T. W. Schultz, *Transforming Traditional Agriculture*, Yale University Press, 1964. See Chapter II, 'Investing in Farm People'.
5. Unesco, *World Illiteracy at Mid-century*, Paris, 1957, 200 pp. (Monographs on Fundamental Education, II.)

is growth by extension (the great deforestations of mediaeval Europe, the settlement of America by Europeans, etc.) or through improvement as regards a limiting factor (water supplies in arid zones, etc.).[1] On the other hand, economic history also provides noteworthy examples of agricultural growth going hand in hand with rural education – Denmark, Israel, Japan, etc.

In the developing countries, the prior necessity of education is sometimes disputed on the grounds that it is possible to achieve rapid growth despite a certain percentage of illiteracy: some illiterates have enough intelligence to be receptive of progress; we must not discount traditions of 'learning by ear' and modern techniques for propagating new ideas. It is not the provision of education which is called in question but rather its scale and timing. We must not, however, lose sight of the fact that the developing countries want to accelerate their growth (and they will not manage it relying on the procedures and techniques of the days when Western growth was starting). They have to convert a traditional peasant agriculture founded on experience which is certainly considerable but often vitiated by a miscellany of fallacies and superstitions (subsistence farming areas) into a progressive agriculture geared to innovation. W. A. Lewis has pointed out that in many cases 'expenditure on bringing new knowledge to peasant farmers is probably the most productive investment which can be made in any of the poorer agricultural economies'.[2] Again, as already mentioned, education is not only an investment, but is increasingly recognized as a basic right of the individual, a way of escape from social inequality and a variety of constraints. An education which promotes and propagates new ideas begets not only new things but new men: it changes men's attitudes and relationships, raises the level of their aspirations and makes it easier for them to accept and assist in the change which is an essential condition of economic growth. Education may help to increase output or to reduce cost but its fundamental purpose is to help build a progressive society in which men are equipped to keep on inventing the new socio-economic forms of national development.[1]

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[1] T. W. Schultz, op. cit.

[2] W. A. Lewis, *The Theory of Economic Growth*, London, Allen & Unwin, 1955, p. 187. See also a number of R. Dumont's publications.

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Education and occupational transfers

In the advanced countries one of the objects of the educational system is to facilitate occupational mobility. Rapid growth brings with it a process of accelerated change and developing general education, plus the organization of a 'system of mobility-slanted intellectual investments' facilitates the additional training and retraining made necessary by growth. In the developing countries, while the process of industrialization requires, in particular, the transfer of plans of the agricultural population to non-agricultural occupations, it is observable that, in most of them, agricultural education often leads to switch-overs at a rate beyond what the non-agricultural sectors require and to the detriment of the agricultural sector which loses part of its skilled labour. Thus a fundamental antinomy emerges: the development of education is necessary to ensure rural development but there is a danger of its end result being to ease entry to non-agricultural employments, and speed up the exodus of the most talented and best educated.

In more general terms the acceleration of the flight from the farms sets off 'hyper-urbanization' phenomena and converts overt or covert rural unemployment into urban unemployment with all that that implies in the way of slums, a glutted labour market, inflated social services, parasitism, social pressure, discouragement of new ideas (low salaries), and division of the funds needed for development. This kind of situation is traceable to many causes. Some are economic (low and uncertain peasant incomes); others are of a socio-psychological nature: peasants are traditionally subjected to a multiplicity of constraint; agricultural work is deemed 'servile' and often despised, etc. The result is that for many countrymen moving upward in the social scale means changing their occupation.

Education and growth objectives

In the face of the above situation, remedies have been suggested which include the revision of rural primary and secondary school

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[1] F. Perroux, *L'Économie du XXème Siècle*, Paris, Presses Universitaires de France, p. 563.

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programmes. To the extent that the acceleration of the flight from the land has a psycho-sociological basis, with social standing linked to property or the discharge of functions whose real importance is not in tune with the exigencies of economic growth, the educational system as a whole may play an important part by rehabilitating manual labour, by explaining the role of the agriculturalist in economic growth as a whole, and by destroying illusions. Although the necessities of over-all development frequently lead to the opening of specialized establishments for industrial or agricultural vocational training, it is desirable that technical education should not have the appearance of a category on its own, fenced off and looked down on. In developing countries, the educational system should make a point of approximating the 'technical' to the 'regular' stream, and turning out the 'cultural technicians' so necessary for the organization of a balanced and humane expansion. If the education system takes growth-as-an-end into consideration, it can help to give a juster idea of values. From this point of view, 'agricultural education' lies in the domain of the general educational system and not simply in that of agricultural instruction in the narrow sense.

Education and the modernization of rural life

Although it may frequently be necessary to redesign school programmes to adjust them to growth objectives it is equally obvious that this adjustment is not enough. Thus, the revision of rural school programmes, or the installation of agricultural schools in country areas, is not by itself adequate to solve the problem of the flight from the countryside: the development of rural education must keep pace with the transformation of the structures of agriculture.

The writer unreservedly shares the view expressed by Professor F. H. Harbison that 'In this age of rising aspirations and spreading mass communication the sons of farmers are not going to sentence themselves to traditional agriculture if they can possibly avoid it. The only fundamental solution is the modernization of rural life. This calls for sweeping measures such as land reform, agricultural research and extension services, widespread rural community development programmes, the effective utilization of rural labour in the building of roads, irrigation systems, houses, and schools, and other programmes aimed at making rural life more productive and attractive. If people see a positive reason for remaining in the rural areas and a promise of a better life there, the problem of revision of curricula in the schools will be relatively easy to handle.'[1]

Throughout the nineteenth and twentieth centuries, European farmers have been complaining of the 'skimming' of the countryside, the loss of the 'best men', etc., but it seems obvious that a given sector of employment can only keep its best people if it offers them the chance of making the most of their knowledge and energies, a pattern of life which measures up to their ambitions.

The writer therefore wants to underline the fundamental principle that educational levels and the levels of development of particular occupations are related: the modernization of agriculture both causes and is caused by the development of education.

The backwardness of agriculture limits its capacity to absorb educated people, so a concomitant of rural education must be a vigorous effort to reform and modernize agriculture.

'. . . we cannot divorce farmer training from the whole process of agricultural improvement of which, in fact, it forms an integral part.'[2] Agricultural growth requires the development of rural education but usually fundamental changes in the landowning system, the size of production units, agricultural credit and marketing arrangements, etc., as well.

Co-ordination of intellectual investments in agriculture

Rural development involves a combination of integrated operations and education is one among the forms of action which together conduce to the growth of agricultural production, the enhancement of well-being and the upgrading of the individual. The various forms of intellectual investment – research, schooling, extension services, etc. – need to be co-ordinated among themselves and with the educational system as a whole. The organization of 'land grant colleges' is often cited as an example of co-ordination.

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[1] F. H. Harbison, op. cit. p. 444.

[2] Fergus B. Wilson, 'External Conditions Essential to Success in Farmer Training.' Paper read at the seminar on agricultural education and training in Africa, organized at Zaria (Nigeria) by FAO in co-operation with Unesco in June 1965.

In more general terms, the educational system should cover the whole of the rural community. It can be asserted as a fact that there can be no real individual upgrading without upgrading the whole group and this implies rejection of the view that education could be restricted to a small number. Certain experiments in peasant farming areas have clearly demonstrated the danger for the local leaders of no longer being understood and followed unless a concomitant of training them is training the mass collective upgrading. In view of this, the school-centred idea of education is increasingly giving way to a comprehensive idea embracing the community in its entirety, concerned for community upgrading and slanted towards generalized continuing education. Community development fits education into an all-round development picture.

Community development

The principles of community development inform a variety of approaches under a variety of names. Its aims are material (increased production), educational (substitution of positive for traditionalist *status quo* attitudes), and social (development of community and team spirit). The philosophy of community action consists of 'helping the peasants to help themselves'. It is built on an all-round approach to the problem and co-ordinated action by the several specialities in rural development and this procedure is felt to be extremely important. The specialists in health, education, primary education, adult education, domestic economy, agricultural extension work, co-operatives, etc., should conduct a co-ordinated operation at village level, but it often happens that this co-ordination is not secured, which is profoundly regrettable. The sharp criticisms sometimes made of community development appear to be directed more at how it has been carried out, at the ideological, paternalistic or political deviations found than at the principles. There are also cases when agricultural growth is insufficiently emphasized and a reminder is needed that economic growth and social development should go hand in hand.[1]

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[1] Report of a community development evaluation mission in India.

Mechanisms for the creation of a progressive society

The key to agricultural growth is most often to introduce a technological change. Its main determinants are research, training and information, plus the existence of institutions to make it easier for the people to assent and contribute to community growth. Co-operatives and 'community developments' are examples of this type of institution.

In other countries, especially those which are French-speaking, there are *animation rurale* movements to 'sell' development and education. The *animation rurale* services have the task of finding and training local rural development agents (selected from among the peasants and intended to remain peasants) with more specific responsibility for driving home to the local public the importance of rural development and how it is effected and thus securing the cultivators' support for and participation in operations which serve directly for the upgrading. The *animation rurale* movement, then, is intended to incite the peasants to education, to show the need for a basic general education, for occupational education, and for technical information and diffusion networks. By making it possible for these peasants to grasp the part education plays in improving their output and living conditions, the *animation rurale* can contribute powerfully to the development of rural education. As already pointed out, however, the development of rural education must be coupled with a determined effort to modernize rural life. *Animation rurale* raises the levels of the peasants' aspirations and expectations and, like community development, may lead to grave disillusionment unless accompanied by a growth in agricultural production, which is a precondition for overall growth and the improvement of the people's economic well-being.

Research and experimentation services

The 'research ratio' or proportion between expenditure on research and experimentation and the value of the ultimate agricultural yield gives a good approximation of the effort furnished by nations, sectors and areas for the advancement of agricultural knowledge.

In Europe, this ratio is highest for the Netherlands, where it is over 1 per cent. Since the agricultural 'industry' is mostly made up of small and middling enterprises, 'company' research is on an insignificant scale. Hence, in getting agricultural progress going, a key role falls to the State or local authority as instigators of research (in the form of collective investigation) or as its immediate patrons (institutes financed mainly from public funds). In the past, research institutes, usually specialized, have been founded for studies relating to the growing and international marketing of tropical 'plantation' crops. Today the problem consists mostly in organizing or reorganizing research services in the light of a more comprehensive vision of the rural development problems to be mustered and co-ordinated. The modernization of subsistence farming should not be neglected.

Networks for the generation and diffusion of progress

Agricultural progress involves successively discovery, testing, demonstration, adoption on a practical scale by farming pioneers and dissemination of the new ideas within the rural community. The generation of progress is effected by networks which may be maintained by business interests (agricultural and food industries), by the 'agricultural' professions or by the authorities. 'Agricultural extension services' were started by most of the countries of Western Europe as early as the end of the nineteenth century and these services have grown in strength and scope throughout the twentieth century. The Netherlands has reached the highest 'extension officer density' with about one officer for every 200 holdings, or 500 active land workers for 2,000 hectares, followed by Denmark (250 holdings per officer). The purview of the agricultural extension services has grown steadily: originally limited to the technical aspects of production, it has gradually given more and more prominence to the scientific organization of work, farm management, marketing, domestic economy, etc. In the recently started process of reorganizing agriculture on industrial lines, the system of 'integration contracts' permits of rapid and controlled diffusion of technical information determined according to the requirements of the market.

In the developing countries, the agricultural extension services can play a key part in agricultural growth by purveying what is, in practice, training as well as information. These services must be so designed (having regard to population density and structures, communication facilities, types of production, etc.) that the extension officers can hold at least enough meetings and demonstrations to be over the minimum below which the efficiency of agricultural extension work is threatened. Care must be taken to keep this technical service for its essential task and to avoid burdening it with an excess of administrative duties.

Level of development and type of training

The rural education system, as a co-ordinated whole, must further be adjusted to a country's particular stage of socio-economic development. All systems of education are historical 'categories', in other words educational systems are not transferable from one country to another unless the two are at comparable stages of global socio-economic development. In the developing countries, a 'trade-school' type of instruction designed for adults filling the different jobs of an agricultural area may often be the priority requirement. In Western Europe, agriculturalists want agricultural education to have a large content of general culture and to award certificates on a level with those in the other branches of formal education. In the developing countries, the agricultural extension services, in practice, have a full-blown training role. In the advanced countries, these services are addressing themselves to educated and receptive agriculturalists and this role is more specifically to propagate information on improvements of all kinds. It is thus necessary to adjust the system of education to the particular stage of economic development. Moreover, an educational system is not only an historical, but also a geographical 'category' tied in with a people's socio-political philosophy, with its traditions and with ethnic considerations. Care must be taken therefore not to be too hide-bound or too regardless of minutiae. Most nations with a federal structure leave the member territories considerable latitude as regards education.

Growth process and training programmes

There should be a close relationship between the occupational training programmes, forms of demonstration organized, etc., and the growth process chosen by a country, or, more accurately between the types of training and the types of agriculture which it is proposed to develop. In a subsistence agriculture the raising of standards of well-being implies the improvement of food growing methods, the modernization of the land-use structures and the villages, using local means and more particularly the labour available, etc. As they are not 'transposable' the teaching of larger scale farming techniques is of little interest in a milieu given over to subsistence or small-scale commercial agriculture.

All too often, the equipment of the agricultural schools and model farms is beyond the reach of most cultivators and thus in practice presents little usefulness to them.

'We have often, in the past, ignored the fact that under existing systems of land tenure many of the improvements we advocate are impossible to put into practice. We have also tended to forget that farming is a business and that to adopt new crops, methods and practices is only attractive if there are good prospects of real and substantial cash benefits from so doing.[1]

Making progress meaningful

The key question could well be 'Who pays the cost of progress and who gets the benefit?' The changes needed for growth are made far easier by a clear idea of its benefits to individuals and the community. Receptivity to technical progress can be increased appreciably if those who have to tackle the changes know that they will reap the benefit of them. Lack of economic incentives results all too often in an attitude of indifference on the part of the people. Getting support for a policy of rural development involves informing cultivators clearly of its anticipated effects.

The main forms of rural education

The rural primary school

Sixty per cent of the earth's inhabitants are peasants. Many are illiterate, and for most basic education does not now, and will not soon, go beyond the primary level.

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[1] Fergus B. Wilson, op. cit., p. 2.

The objectives, structures and methods of the rural primary school are of exceptional importance. In the development context, the rural primary school must indeed provide basic education for those who will cultivate the land but also for a very large number of young people whose working lives will lie outside agriculture. One of the fundamental problems of growth is the redeployment of labour to match the development of the several sectors and branches of production. In this respect, the primary school is required to discharge a twofold task extending beyond education to vocational guidance. In those countries where the flight from the countryside is excessive, it is even required to help slow it down.

Since most agriculturalists in the developing countries will get their education in primary school and almost exclusively in these schools, it is for the latter to instil a liking for country life and to lay the foundations for the comprehension of, and receptivity towards agricultural progress. The basic education is intended to afford a knowledge of reading, writing and figures and the proportion of wastage in the developing countries indicates that this is in itself an ambitious target. For 'practical betterment' lessons by the method of observation and reflection, rural schools can always use the rural milieu itself as their teaching material and can even reckon on certain specific aids such as school gardens and small livestock breeding, simple handicrafts, practical dietetics lessons, etc.[1] Care must, however, be taken not to misconceive the 'occupational' impact of the rural school even though the rural primary teacher can play an important part in increasing local well-being when his bent is for vitalizing the basic collective unit and when he works closely with the grown-ups and with the agricultural extension services.

Any good school 'will widen children's horizons beyond what can be satisfied by the economy of three-acres-and-a-hoe'.[2] It is indeed essential to adapt the programmes to the life of the countryside but obviously the adaptation in itself cannot be made the instrument for keeping men on the land (when this is justified) and it should not be of such a nature as to create inequality of opportunity over access to secondary education and thereby institute discrimination between town and country and selection according to milieu rather than actual ability.[1]

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[1] The separation of pre-secondary education into two cycles corresponding to 'primary' school and 'intermediate' school facilitates this orientation (e.g., the Tanganyika experiment; see A. P. S. Forbes, *School Farms—A New Approach in Tanganyika)*.

[2] Unesco, *Conference of African States on the Development of Education in Africa, Addis Ababa, 1961. Final Report*, Paris, 1961, p. 11.

Adult education in rural areas

Unesco's World Campaign for Universal Literacy[2] is largely a struggle against peasant ignorance and thus it joins up with the world campaign against hunger. Adult education in rural areas aims simultaneously at reducing illiteracy, alleviating the inadequacies arising from the fact that a great many peasants quit school without completing the primary course (large-scale wastage), providing 'after-care' for new literates, contributing to their human betterment, providing them with occupational training and information by arranging courses and through guidance or extension services. There is little doubt that, with its different forms duly co-ordinated, adult education should play an important part in the evolution of the developing countries' rural communities.

In the advanced countries, there has been a new development of adult education and information recently to meet legislation on 'social betterment'. The trend is towards its incorporation in the broader concept of continuing education which, in relation to the acceleration of progress, embraces all socio-professional categories and all the workers in these categories at every level of training and responsibility.

Agricultural vocational education

A distinction is drawn in most countries between 'vocational' education which is primarily designed to turn out agricultural

[1] In the developed countries, the rural population in its struggle for parity is laying increasing emphasis on 'equal opportunity for access to education'. It knows that the primary education structures born of late-nineteenth-century legislation are no longer adapted to a real democratization of education and it demands the regrouping of schools, the organization of school bus services, vocational guidance, etc.

[2] United Nations Economic and Social Council, *World Campaign for Universal Literacy*, 15 May 1963. Unesco: various publications.

workers and agricultural technical education which is primarily designed to turn out the technicians for agriculture.

In the developing countries, vocational schools – for adults whose 'dedication' and abilities have been detected by the *services d'animation* or extension services and of an age to have some impact on the traditional milieu – may play an important part. This type of vocational school presents some analogies with the 'farm school'[1] of nineteenth-century Europe, although with the latter some mistakes were made which it would gain by avoiding. It aims at providing the greatest possible number of future cultivators in the shortest possible time with instruction based on observation of the facts and the practice of the farming operations. Accordingly, the course is the length of a single production cycle; in some instances it is run on a 'shift'[2] or on a 'sandwich course' basis.

Agricultural technical training

The trend in the more advanced countries is to give preference to an agricultural technical education dovetailed better and better into the global educational system as regards its structures (analogous to those of technical and general education and permitting transfers from one branch of education to another, via 'bridging' classes where required), as regards its programmes and methods (cultural equivalence), and its end results (equivalence of certificates).[3] In the developing countries, however, the integration of agricultural technical education into the over-all educational system may have to take place by stages. Its immediate task is to produce the technicians urgently required by the agricultural sector but at the same time it should be planned on sufficiently flexible and evolutive lines to be able to fit into the over-all system of education as soon as practicable. It is impossible to provide for the training of technicians by adapting the structures of general education: the reasons are the length of the courses (especially when teaching is not in the students' mother tongue), the frequent impossibility of installing experimental and demonstration centres near the urban teaching establishments and the paucity of agricultural teachers. On the other hand, it is necessary to combat the unwarranted foundation of unduly specialized schools and the waste and manifold difficulties this causes. Conclusive arguments for a 'common stem' at all levels for farmers, stock-breeders, foresters, agricultural engineers, veterinarians, etc., are the practicability of giving them a common basic training, the need to forge bonds of friendship between these services and the 'global' notion of rural development.

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[1] René Dumont, *Agricultural Development, particularly in Tropical Regions, necessitates a Completely Revised System of Education*, Paris, Unesco, 1963.

[2] cf. M. Berge, C. Preval and P. Tissot on agricultural vocational training centres for young people and adults in some French-speaking African countries, Zaria seminar, 1965.

[3] This trend is in line with that favoured by Unesco which recommended at the twelfth session of its General Conference that technical and vocational education should be an integrated part of an over-all system of education and, as such, due consideration should be given to its cultural content. It should do more than train an individual for a given occupation by providing him with the necessary skills and theoretical knowledge; it should also, in conjunction with general education, provide for the development of personality and character and foster the capacity for understanding, judgement, self-expression and adaptation to varying environments. To this end, the cultural content of technical and vocational education should be set at such a level that the inevitable specialization in technical and vocational education does not stifle broader interests.

Technical education may be short (first cycle of secondary education) or long (first and second cycles of secondary education) with opportunities for first-year specialization at each level.

The essential thing is to produce what the developing countries need most urgently, namely technicians for work on the ground and this implies training students and teachers on practical lines.

Higher agricultural education

The developing countries must also provide (possibly in association) for the training of their senior cadres – agronomists, veterinary surgeons, etc. (full-length higher education course) and technical engineers (abridged higher education course). In many countries, the speeding up of rural development is basic to over-all growth and the universities' teaching structures must evidence their concern to meet the requirements of their nation's economic and social development.

'In the early stages of development the small number of high-level technicians can probably be borrowed from abroad. It is as the country begins to get into its stride, as new industries and agriculture compete (usually successfully) with government for the service of the few available graduates and senior technicians, that the situation becomes most serious.'[1] The Conference on the Development of Higher Education in Africa, which Unesco organized in Tananarive in 1962, served to determine the position of higher education and to lay the foundations for its expansion.[2]

As may be seen from the statistics contained in the report of the conference, only a little more than one-third of the students are taking the scientific or technical disciplines, against the '60 per cent by 1980' which the Addis Ababa Conference considered desirable. The proportion of students taking agronomics is particularly low, being about level with or lower than the percentage in the advanced countries, where, however, the actual number of agronomists available is relatively high and a high level of industrialization has been reached.

The Tananarive Conference noted this situation and emphasized the need for a specially vigorous effort in this domain: 'Student enrolment in agriculture, forestry and fishery should be increased in African institutions. More incentives should be offered to students for entering such courses, including raising the status of agricultural professions and providing generous scholarships for study at home and abroad in agriculture and related subjects. One effective means of promoting agricultural education might be through the establishment of colleges of agriculture in rural areas by co-operation between government and local communities. As a target the proportion of student enrolment in agriculture and related subjects might be raised from less than 4 per cent at present to as much as 8 per cent in the near future.'[3]

Education of women

All the types of education so far considered are implicitly for both sexes with no discrimination. In view of the fact, however, that the woman's level of education is often lower than the man's, that women play an important and often decisive part in agriculture in many countries and that furthermore the content of the teaching must sometimes be adapted for them, a paragraph needs to be devoted to their education specifically. Although the principle of educational equality in accepted, generally speaking, in the developing countries, unfavourable factors are cumulative and the education of women is held back accordingly. The development of co-education when possible is often the prerequisite for achieving genuine equivalence.

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[1] Unesco, *Education and Agricultural Development*, op. cit., p. 49.

[2] Unesco, *The Development of Higher Education in Africa*, Paris, 1963, 32 pp. Report of the conference held in Tananarive from 3 to 12 September 1962.

[3] Unesco, *The Development of Higher Education in Africa*, op. cit., p. 24.

In many countries, the living standards of large number of peasants will for a long time to come be determined by the state of a predominantly or largely subsistence farming economy. This being so, the modernization of subsistence farming economy is a fundamental factor in the improvement of economic well-being and women can play a decisive part in the amelioration of food growing, dietetic balance, health and sanitation, housing, village organization, community life, etc. We therefore need to develop the teaching of rural domestic economy and to train the female cadres needed for the improvement of living conditions. However, given the role of women in agricultural operations, it is also essential that they should be given an education bearing upon the problems of rural development and be fully awakened to the important part which they can play in that development.

The training of teachers and agricultural extension officers

The training of rural school-teachers, instructors for *centres d'animation* and vocational retraining and training centres and teachers for agricultural technical education is the determinant for the development and success of rural education in its various aspects.[1]

It is quite obvious that the rural teachers' two buttresses are a common stock of data and methods derived from psycho-sociological analysis of the rural milieu and a knowledge of agricultural techniques. Centres of pedagogic studies and agricultural research, plus testing entities and extension services, are therefore basic organs for the training of teachers and professors. A debated point is whether it pays to teach rural teacher training schools or agricultural senior normal schools out in the country or whether it is preferable to set up 'independent agricultural sections' within all-purpose teacher-training schools. The consideration of preserving the links between agricultural education and the general system of education may make the creation of agricultural divisions in all-purpose normal schools preferably subject to the essential condition that the absolute necessity of practical training in the developing countries be explicitly recognized and that measures be feasible to make this training possible and effective.

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[1] R. Dumont, *Agricultural Development* . . ., op. cit.

The training of extension agents should be arranged for at the several levels of agricultural education as specialist courses on completion of the first and second secondary-level cycles and of the degree courses in the *écoles d'ingénieurs techniques* or *écoles d'agronomie* respectively. It can be advantageous to arrange for these specialized courses to be taken in a limited number of schools to make sure of having the means for effective training. As in the case of teachers, particular attention must be paid to practical training, a prime requisite for effective response to the needs of the countryside in developing countries. But great importance must also be given to psycho-sociological and 'instructional' training. The teacher and the extension agent must be equipped to analyse and comprehend a given community in all its aspects and be trained in the techniques of communication. It appears obvious that all teachers and extension agents should be given first-rate training in the processes of agricultural growth, the relations between agricultural and over-all growth, the techniques of rural development, etc. They are in fact being called on to become the instigators of a process of socio-economic transformation on which they should be properly informed.

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Programming of rural education in relation to the development of education in general and the over-all programme of socio-economic development

Since one of the fundamental aims of education is economic and social development, the programming of education as regards staff, resources and methods is closely tied in with the over-all socio-economic development programme. The first practical problem is how the planning should be organized.

In this connexion, the following suggestions have been put forward: (a) Planning responsibility to vest in a general directorate of planning and the administration of education to be with the appropriate departments of the various ministries when, as is usually the case, several ministries are purveying it; (b) planning responsibility to remain with the concerned directorates of the ministries, with a planning secretariat for co-ordination and harmonization.[1]

Both approaches have their advantages and disadvantages, the choice of institutional structures being governed by many factors, some of them arising from considerations of a socio-political nature. The main thing is that rural education should not be treated as a separate category. On the contrary, it is necessary that the plan for rural and agricultural education be drawn up in close harmony with the over-all educational plan in the perspective of the global training requirements for economic and social development.

'Planning calls for highly qualified staff.[2] Specialists in this field are usually rare and must therefore be trained. A special effort should be made to produce experts in rural education in view of the specific problems raised by this type of training. The inclusion of such specialists in general education planning teams would be calculated to illuminate the taking of decisions not only for the rural educational system but also for systems of education as a whole. It has been the writer's experience that, all too often, education plans deal too summarily with rural education and fail to establish clearly the articulations between it and general education or for that matter those between agricultural training, adult education, occupational extension services, agronomic research, etc. In other words, no consideration has been given to the respective roles of the various categories of intellectual investment and nothing has been done to co-ordinate them.

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[1] Unesco, Office of Educational Planning, *Education Planning Practice in the Developing Countries*, Paris, May 1965, 72 pp. See p. 6 et seq.

[2] Unesco, Office of Educational Planning. op. cit., p. 9.

General problems in the programming of education

To accelerate growth the accumulation of knowledge and of capital must be accelerated simultaneously. It is of primary importance that politicians and those responsible for planning should understand that the development of human and material resources must be carefully integrated in any over-all plan for increasing economic potential.

Further arguments for the programming of education are the time lags before trained teachers, engineers and technicians are available, the high cost of education in proportion as it expands, the need to produce reasoned financing programmes, etc. Programming makes it possible to appreciate the real effort which must be undertaken, to detect the limiting factors and obstacles to expansion and to make timely dispositions for this reduction by appropriate means. It is from this angle that 'forecasting' has warranted description as creative. However, the possible bases for the forecasts need to be stipulated.

The economic angle: investment education

From the viewpoint of investment education, the essential aim of the programming is to organize the training of skilled workers to fit the needs of economic development.

Professor W. A. Lewis has put the problem as follows: 'Teaching an African cook to read may increase his enjoyment of life, but will not necessarily make him a better cook.... The money spent on teaching cooks to read might equally be spent on giving them pure water supplies, or radios, or better housing, and must therefore compete in the context of all other possible uses of resources' – in other words, the resources diverted to education are diverted from the development of the infrastructure, factory building, occupational and rural redeployment, agrarian reform, the fight against disease, etc. 'In this perspective the needs of economic development help to determine the minimum amount which must be spent on education. How much to spend above this minimum depends on how rich the society is, and on competing claims.'[1]

The minimum programme of education is based on the forecast of the number of hands needed, and their qualifications, per work sector.

Where a comprehensive economic development programme exists, employment forecasting is an essential element in the overall programming, and is effected by extrapolation or projection forecasting. The evolution of the labour market is governed by the evolution of the volume of production and of the productivity of labour.

The social angle: 'consumption education'

The problem of education arises in terms not only of economic efficiency but also of equality of access to education for the various social-occupational categories. The campaign against illiteracy is justified by the acknowledged right of every individual to the chance of basic education.

The statistics available for individual countries often reveal marked disparities to the disadvantage of the rural population. These disparities are not always warranted economically and as a matter of simple equity, education must provide for the concurrent economic, social and cultural advancement of the countrydwellers.

As already emphasized, differentiation between 'investment education' and 'consumption education' is not without its difficulties: the dividing line is not always clear-cut. A course of education planned in the perspective of economic development must not only be altered to working policy but also needs to produce greater acceptance of change, encourage innovation, pick out the *élite* from the mass of the population, make it possible for the best men to attain to responsibilities commensurate with their abilities and, finally, bring about the 'mass betterment of the population' which is a prerequisite for over-all effectiveness. 'Education yields a very high margin of indirect returns since it is aimed directly at modifying people rather than things.'[1]

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[1] W. Arthur Lewis, 'Education and Economic Development', *International Social Science Journal*, No. 4, 1962, p. 685.

On grounds of equity and effectiveness alike, the inference from the social considerations is that basic education should be made available to all and secondary and higher education expanded as far as possible; but, given the limited resources, the problem remains one of putting what is available to best use.

Investment and consumption: the best use of the resources available

The minimum acceptable educational programme is what is required to turn out the trained labour needed for economic expansion. For many reasons, however, countries want to go much further. At that point the decision on educational targets must be made in the light of the cost of this instruction, the funds needed to obtain given percentages of pupil output at the several levels of education, the changes bearable by the community give the level of development, and the need to reduce the inequalities productive of social stresses.

The cost of schooling depends on a variety of factors and Professor Svennilson's formula is one of the most expressive and convenient. Taking U_i as the total cost of education for a category i, Professor Svennilson[2] gives us the equation:

$$U_i = P_{si} \times e_i \times t_i \times W_i (1 + k_i)$$

P_i being population in the age group concerned, e_i enrolment ratio, t_i teacher/student ratio, W_i salary per teacher, and k_i relation of other-than-teacher costs to teacher cost per pupil.

This formula may be used for a geographical zone, a sector of the economy, types of training, etc. It provides a jumping-off point for discussion of the cost of instruction and means of reducing it.

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1. Unesco, *Elements of Educational Planning*, Paris, 1963, p. 8. (Educational Studies and Documents, 45.)
2. OECD, 'Targets for Education in Europe in 1970', *Policy Conference on Economic Growth and Investment in Education*, op. cit., p. 39.

The investigation may be directed to reducing costs per unit group of pupils – teachers' salaries, building expenses, school expenses, maintenance cost for pupil, duration of schooling, etc. From the economist's point of view, however, it is the productivity or the yield-cost relationship which should be measured. Making these measurements presents many difficulties and the results are far from being satisfactory.[1]

It would seem clear that, where resources are limited, the number of pupils given schooling depends on reducing the cost per pupil. Reducing the cost per pupil may prompt a reduction in the length of schooling and some will view this as opting for a huge mass of poorly educated people rather than a well-educated *élite* fitted for leadership and the responsibilities of development. In rebuttal it can be argued that, for many reasons, abridged elementary schooling for all should be made good by upgrading machinery enabling cadre personnel to be picked out at any age.

The excessive cost of education copied from Europe has given rise to sharp criticism.

'Underdeveloped countries should not merely copy the educational systems and methods of industrialized countries, which are too expensive and not adapted to their particular needs. It is therefore necessary, during a transitional phase, to make use of all appropriate means and resources, and preferably to employ national resources. The importance of female education, adult education, accelerated professional training, intensive teacher training, audio-visual methods, co-operatives and the training of agricultural instructors was stressed.'[2]

The extension of education socially desirable is conditional on hitting on a really efficient type of education, meaning one adjusted to the objectives of economic growth and relatively cheap.[3]

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[1] cf. Charles Benson, 'Teaching Methods and their Costs. Productivity of Present Educational Systems', *International Social Science Journal*, No. 4, 1962, pp. 676–84.

[2] Unesco, *Elements of Educational Planning*, op. cit., p. 37.

[3] 'The very long course of general education usual in Europe, which aims at embellishing the mind, is too roundabout and produces results very slowly. The maintenance of this system in countries where more than half of the population is under twenty years of age puts up the cost of education far too high; this necessarily restricts it to the few . . .'. R. Dumont. Doc. Unesco/SS/PP/1 + 2, p. 19.

The strategy of rural education

Earlier in this report, there has been repeated insistence on the connexions between education, rural development and global economic growth. The essential idea is that education is an historical 'category' tied in with the stages of economic growth and a geographical 'category' tied in with the social philosophies of peoples. The strategy of rural education must therefore be devised with due regard to developing countries' categories.

Three categories are distinguishable[1] and are definable – with acknowledgements to the work of the United Nations – in the following terms:

Category I. Countries in which a subsistence economy unmistakably predominates and will continue to do so during the forthcoming plan.

Category II. Countries where a modern agricultural economy is developing from a foundation of subsistence agriculture or by the creation of new socio-economic patterns of production in the context of the country's global economic growth.

Category III. Countries where a modern agricultural economy predominates.

Here, however, agreement is needed on what is meant by a 'modern economy' (subsistence agriculture can be modern) and this necessitates taking the agricultural growth processes into account.[2]

The above categories may also be regarded as 'stages of growth' conditioning the 'stages of education'. The reality, however, is frequently more complex, with economic structures and types of education corresponding to disparate stages of growth co-existing at a particular point in time in the same area.

Strategy for category I countries

The object here is to increase physical well-being in particular as regards nourishment and health by 'modernizing' subsistence agriculture (food crops), to improve living conditions (villages and houses) and to raise craft standards.

What is required of educators, agricultural and general, is to help develop a love of country life, to afford a grasp of the role of agriculture in economies where global growth is still small

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[1] Unesco, Office of Educational Planning, *Educational Planning Practice in the Developing Countries*, Paris, May 1965, p. 16.

[2] See page 28.

(to prevent a rush to the towns and its consequences), to create nation-wide understanding of the exigencies of the extended phase of subsistence agriculture in certain areas, and to combat certain 'snobberies' productive of grave imbalances.

At this stage of development, it is obvious that it should be an object to preserve the folk culture and that the rural school should be focused on rural life and community education. At the same time, the system must not be such as to rule out or hinder access to secondary or higher education for country children, ending with the selection of the *élite* on birthplace rather than aptitude.

Particular attention should be given to the training of women. As far as agricultural occupational training is concerned, it needs to be primarily practical as indeed does the technical education which precedes it. The latter's development at primary and secondary levels should be a priority task since the chief requirement of this type of agriculture is middle-level cadres. The training of veterinary surgeons and agronomists to replace foreign elements, is, however, indispensable (it will usually be carried on under pluri-nation arrangements with outside technical co-operation).

A society in which a subsistence economy still predominates is limited in its resources and a policy of educational priorities and cost reduction should be systematically applied.

Strategy for countries in category II

The object is to facilitate the transition from subsistence farming to commercial agriculture by organizing the production of the foodstuffs necessary for the growth of the non-agricultural sectors. A further ground for developing commercial agriculture can be the contribution required of it towards squaring the balance of payments and towards imports of capital goods necessary for growth. In the developing countries, a modern commercial sector in the form of plantation agriculture, created through the initiative of advanced countries, frequently coexists with the traditional type of agriculture but, in the majority of cases, new cadres have to be trained for it; sometimes the sector has to be partially reconverted and often it has to be used as the instrument for propagating advances in agricultural practice.

To create a 'competitive' agriculture capable of providing relatively cheap foodstuff for domestic consumption and for export while still procuring the improvement of peasants' living standards the accent must be put on those factors which improve productivity and notably on the dissemination of new production techniques.

Once this stage of rural development has been reached, adult basic training and education to open minds to change and the organization of large-scale extension networks focusing on the development of applied research and experiment are essential. Technicians' education should remain practical while making more room for general education. Further, marketing, financing, co-operative development and similar questions should figure increasingly in the curricula.

In higher education the training of 'engineering technologists' to run the experimental centres and direct the extension agents is fundamental at this stage but care must also be taken to ensure the creation and development in the universities of the faculties of agronomic service – the centres of training and research which evidence the universities' concern with agriculture as a factor in over-all growth.

Strategy for countries in category III

The objective is to facilitate social mobility and to fit the population as a whole for modern production conditions, so as to reach the high productivity which is the prerequisite for mass consumption. The educational system should afford facilities for all the educational orientations and reorientations possible, which implies free passage between types of education (classical and technical) and between levels. The agricultural education system should be dovetailed into the over-all system of education and place progressively greater emphasis on general education: the first cycle of secondary education could become common to all branches. The training of specialist engineers, agronomists and veterinary surgeons could be decentralized in such a way as to provide regional foci of progress.

Practical problems in the programming of rural education

Structure of educational programming

The rural education plan can be broken down into several 'sectors' or 'primary programmes', but this presentation must not delude the reader: the method being used is that of successive adjustments between the several elements of the over-all plan. We will consider in turn:
the projection of the agricultural employment situation; types of training and their objectives; the programming of enrolments; the programming of educational and vocational guidance; the programming of teacher recruitment and training; the programming of school building and equipment; the plotting or revision of the school map; the calculation of costs and the programming of their financing.

Taking the best available statistics for the base year (*O*), the objectives are determined for a suitably chosen 'projection year'. This must be sufficiently far ahead to enable allowance to be made for the duration of teacher training and of 'diploma' training at the various levels of qualification for the evolution of the employment situtation, etc. In those countries with an economic and social development plan, the education plan should be integrated with it and projections made up to the terminal year of the plan (*p*) though they may be 'steered' by projections whose term is set by the probability of estimations or the time needed to attain an essential objective and which are known as *projections à l'horizon* (*h*). Given the training time-lags, it would seem that the education programming should cover about ten years.

The basic statistics

The statistics needed in preparing the rural education plan relate to the total size of the agricultural population, its structure by sex, age and socio-occupational category (farm-holders, family helpers, hired hands), its geographical distribution, the number and size of the production units, etc. Generally speaking, such data are known only very approximately. In countries in the first and second categories, while the needs are considerable and the means relatively limited, it is none the less possible to prepare a satisfactory rural education programme with approximate data.

The basic statistics also cover the graduate engineer and technician population in the agricultural sector – numbers distribution by functions, by level of training, by age, etc. Even in the advanced countries, these statistics are often lacking and, oddly enough, little is known about this population.[1] In the developing countries, it is easier to obtain the information since most agricultural engineers and technicians are government servants.

Again, the basic statistics include the proportions of school attendance by age groups, the schools in operation, numbers of teachers, numbers of pupils, and whence drawn, the proportion of drop-outs and repeaters, etc. Information on the rural education budget and comparisons of its relationships with the over-all educational budget and with the final gross value of agricultural production may also be of some help.

The norms necessary for planning

For calculating the implications of a proposed programme as regards staff, physical facilities, capital investment and operating costs, it is necessary and convenient to work on norms. These cover, notably, optimum size of class, the number of 'subject-sets' of different categories per class, the number of pupils per teacher, the desirable size of 'subject-sets' and the 'locking-structure' for combining several 'sets', standard lists of equipment, teachers' salaries, construction costs per place, etc. Separate norms should be established for each level of education and sometimes for each region. They may be arrived at from budget estimates (teachers), the study of existing establishments, the construction of 'reference models' or by estimation. These norms are of major importance and should be worked out with the utmost care.

Organization of agricultural training

The main forms of rural education – primary school, adult education, vocational, technical and higher education, women's education, and the training of teachers and extension agents – were described earlier.[1]

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[1] L. Malassis, *Analysis of the Stock of Agricultural Graduates and Technicians and Methodology of Forecasting and Programming Requirements*, Paris, 1965. [OECD, AG(65)2–(b).]

The programming of primary education will not be considered as it follows on the whole, form the general programming of education. Rural development specialists must, however, pay heed to the structures and orientation of the rural school, to enrolment rates, to the school's 'output' (both of 'influenced' and of 'qualified' ex-pupils) and to occupational guidance on completion of school education. The degree of basic education is going to condition the organization of agricultural training and extension services at all degrees. For similar reasons, rural development specialists must pay heed to adult basic education.

The accompanying table represents a reference model of the different types of agricultural technical training, their length, the qualifications involved and the types of activity covered. A detailed and accurate chart is necessary for the drafting of the education programme. In cases where a transformation of structures is

Simplified table of functions, qualifications, types and duration of training of agricultural engineers and technicians (reference table)

Functions	Qualifications	Duration	Type of education
Higher cadres (broad spectrum)	Agronomists, veterinary surgeons, forestry officers, etc.	10 to 11 years	University
Higher technical cadres	Specialized agricultural grasslands, forestry, etc. 'technical' engineers	8 to 9 years	Higher technical
Mid-level cadres, agricultural extension cadres, specialists, etc.	Technicians	5 to 6 years	Full-length agricultural secondary (second cycle)
	Technical operatives	3 to 4 years	Short agricultural secondary (1st cycle only)

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[1] See page 42.

anticipated during the currency of the plan, it is desirable to establish the charts for the base year (O_o) and for the projection year(O_p).

PROJECTION OF AGRICULTURAL EMPLOYMENT SITUATION

Forecasting manpower requirements comes under the head of general planning (Ministry of Planning), not of educational planning. However, the educational planner must have a general idea of forecasting techniques, their possibilities and their limitations.[1] Moreover, the projections available may sometimes be for too short a period to serve for the preparation of an education programme and, where agriculture is concerned, certain special characteristics enter the picture.

Analysis of the evolution of the agricultural population in the advanced countries shows that there is a decline in relative magnitude, in inverse relation to global development, and that in absolute magnitude it passes through three successive phases: growth, maximum size (relative stability), decrease. Virtually all the Western nations have reached the stage of relative and absolute decrease. Many developing countries are at the stage of growth of the agricultural population in absolute magnitude. In these countries there is usually a degree of overt or covert under-employment, difficult to assess, although recourse to 'norms' worked out for a known situation in the conditions of agricultural and livestock production may provide a useful approximation. A distinction must be drawn between the available agricultural population (whether employed or not), the effective working population and the 'normally necessary' agricultural working population.

In a subsistence economy where occupational mobility is limited or non-existent, it is the 'available' population which must be considered but in an expanding economy, it is the furthest foreseeable 'normally necessary' population. Historically, the agricultural population is mainly determined by the demands for non-agricultural labour: it is the creation of jobs in the non-agricultural sectors which fixes the volume of agricultural manpower. The agricultural population is the manpower reserve on which the other sectors draw to provide for their own growth and, in this perspective, the agricultural population may be described as 'residual'. Calculations of the natural evolution of the agricultural population (in terms of the birth and death rates) corrected for losses by migrations to other jobs in proportion to the creation of openings in the non-agricultural sectors, with possible additions for 'parasitism' phenomena (excess townward migration) may therefore give a good approximation of the ultimately foreseeable available agricultural population which may be greater than the 'normally necessary' population. Another approximation consists in calculating the probable evolution in the number of agricultural production units. This evaluation, which involves hypotheses on the evolution of the structures, is not without its difficulties but it has the advantage of permitting the determination of the probable number of 'farm-holders' whose training is a priority requirement.

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[1] Unesco, Office of Educational Planning, op. cit., p. 12

DETERMINATION OF THE EDUCATIONAL OBJECTIVES

Occupational training

This is the combined product of agricultural extension work (short courses), vocational training in the strict sense of the term (long courses in training centres) and agricultural technical schooling. In the 'first category' countries, the short courses will as a rule be sufficient; in countries of the second category, the training of adults in proper centres throughout an agricultural year can be developed with advantage.

As a first approximation to estimate the annual training intake of prospective farm-holders, we can reason as follows: if, in a zone Z, the probable number of holdings is 1,000,000 and if the average working life is 30 years, then the annual number of young agriculturalists to be trained will be 33,000.

If it is judged desirable to train 10 per cent of the future 'farm-holders' at vocational centre level so that they can later form a satisfactorily close network of modern agriculturalists, then the annual enrolment at such centres will be 3,300 and if the number desirable in each centre is between 30 and 35, the number of centres to be established will be 100, to be distributed on appropriate geographical basis. Of course, if the number of other farm-holders trained is low or nil, the over-all proportion of trained farm-holders at the end of the first year will only be 3,300 divided by 1,000,000, i.e., 0.33 per cent. If we assume that the number of adults per farm is 4, then the total agricultural population to be trained is 4,000,000 and the over-all proportion trained at the end of the first year will be 0.08 per cent. This shows that the vocational training described should be accompanied by a vigorous drive by the extension services, by the organization of short courses and, obviously, by a major effort in the domain of women's training.

The training of engineers and technicians

This is dealt with by secondary and higher agricultural technical education and by the universities. In the developing countries, almost all agricultural engineers and technicians exercise these functions in the public service (teaching, extension services, administration). Observing that this group's numerical evolution depends especially on the budget appropriations made for its recruitment, the part which can be played by hypothetical estimates of growth, costs and expected results in influencing decisions affecting the budget structure should not be neglected.

Where commercial agriculture shows signs of developing the co-operative sector may become of great importance and the training of cadres for that sector becomes necessary.

Nevertheless, the determination of the needs is beset by many difficulties though recourse may be had to 'cadre manning models', adjusted for the agricultural growth processes envisaged.

The ratio of scientific and technical personnel to the total labour force is sometimes known as the 'scientific and technical cadre index'.[1] In Western Europe, the index is at present estimated at 20 per cent;[2] it is certainly much lower in the agricultural sector but cannot be calculated exactly from the statistics available. Another fundamental question concerns the so-called 'pyramid of technicians'. The effectiveness of the cadre structure depends on the distribution of engineers and technicians by level of qualification. If this distribution is defective, the engineer will be obliged to do a technician's work or the technician to do his best with tasks beyond his qualifications.

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[1] cf. L. Malassis, *Analysis of the Stock of Agricultural Graduates and Technicians . . .*, op. cit., p. 7.

[2] OECD, *Resources of Scientific and Technical Personnel in the OECD Area*, Paris, 1963, p. 110.

The determination of the engineer-technician ratio, in the light of the growth processes chosen and of levels of development is therefore crucial. The indications are that it should, on the whole, rise in proportion with economic growth.[1]

The estimation of requirements at the various levels of qualification should allow for the new posts to be created, replacement for the present cadres, replacements for foreign nationals and possible suppression of posts.

If the number of engineers and technicians to be trained in a zone Z over the next 10 years is estimated at 1,000 (consisting of 333 engineers and 666 technicians, i.e., a ratio of 1 to 2) and if the numbers are at present insignificant, then the scientific and technical cadre-index for the farm-holder population after 10 years will be 1,000 divided by 1,000,000, i.e., 1 per cent, and the cadre-index for the total agricultural population will be 1,000 divided by 4,000,000, i.e., 0.25 per cent.

PROGRAMMING NUMBERS IN SCHOOL

The training objectives, once determined, may be reached by two main avenues – school education and extension service 'upgrading'. Particular attention should also be paid in the developing countries to the possibilities of training abroad and to the media of technical co-operation. The 'upgrading' of technicians by suitable seminars and courses is particularly necessary in countries where agricultural education was little developed in the past on two considerations, namely technical efficiency and social justice (its success is conditional on the perfections of a suitably adapted teaching method).

The numbers in the schools depend on the length of schooling for each type of education and on the coefficients of 'drop-outs' and 'repeaters'. These coefficients may be very high and necessitate a large increase in numbers; they must be determined or estimated separately in each instance. Again the inescapable fact that a proportion of those in the 'agricultural stream' will switch to non-agricultural careers necessitates a further increase in the numbers in the 'terminal' classes of the agricultural stream, to meet the actual requirements of agriculture.

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[1] This is merely an hypothesis.

In the hypothetical situation postulated on page 50, it was reckoned that the number of technicians at a level equivalent to full (two-cycle) agricultural secondary education required for a zone Z would be 66. On the assumption that 66 of these are produced by short 'upgrading' courses and 600 through the medium of schools, the calculation of the numbers for the second cycle of agricultural secondary education (three-year course) will work out as follows, allowing for a 20 per cent loss of 'graduate' technicians to non-agricultural sectors (with no compensating intake from other streams), 10 per cent of drop-outs and 5 per cent of 'repeaters' (both treated as constants for simplicity of calculation).

Class	Determination of increases	Numbers		
Terminal	(a) Number of technicians necessary for agriculture	600		
	(b) Plus allowance for transfers (20 per cent)	150		
	(c) Number of students to be 'qualified'		750	
	(d) Plus allowance for drop-outs (10 per cent)		88	
	(e) Plus allowance for repeaters (5 per cent)		44	
	Number of students required in terminal class (c) + (d) + (e)			882
First	(a) Number of students to be promoted from class I (882 − 44)		838	
	(b) Plus allowance for drop-outs (10 per cent)		98	
	(c) Plus allowance for repeaters (5 per cent)		49	
	(d) Number of students needed in class I			985
Second	(a) Number of students to be promoted from class II (985 − 49)		936	
	(b) Plus allowance for drop-outs (10 per cent)		110	
	(c) Plus allowance for repeaters (5 per cent)		55	
	(d) Number of students needed in class II			1101
TOTAL				2968

Note. The coefficients are arbitrary. The aim is mainly to draw the reader's attention to the elements involved in the calculation.

The allowance in our hypothetical calculation for transfers, drop-outs and repeaters increases the numbers as follows:

$$\frac{2968 - 1800}{1800} \times 100 = 65\ \%$$

PROGRAMMING OF EDUCATIONAL AND VOCATIONAL GUIDANCE

In the perspective of economic growth, the purpose of educational and vocational guidance is to fit the graduations to the needs of economic growth.

It is only to the extent that the system of education is, in fact, adjusted to the needs of national growth that a favourable education-growth ratio exists; where there is no such adjustment 'educated' unemployment may appear to a greater or lesser degree.

The adjustment of the supply of graduates to the demand produced by growth involves twofold guidance: 'educational' and 'vocational'.

The aim of educational guidance is to channel enrolments in the light of pupils' tastes and aptitudes and also of the objectives of the over-all programme of education itself conceived in terms of the requirements for economic and social development. If the length of training for securing a given qualification is n years and t is the graduation year, the choice of educational stream must be made at year $t-n$; but the ground must be prepared for this choice by prior public relations work and by counselling parents and pupils. Educational streaming poses many problems and can only function properly in a 'homogeneous' educational system with 'common stems' and bridging classes, conditions which are rarely fulfilled in developing countries.

The problem of educational guidance is of particular importance in countries in category III.

In principle, educational streaming is determined by occupational requirements, but other considerations may figure in the choice made by families and children. Adjustment of the supplies of 'graduates' to the requirements further presupposes that 'graduates' will take up work bearing some relation to their training and this is not always the case. Thus, in the developing countries, especially, a proportion of graduates from the agricultural stream take up non-agricultural activities. Moreover, they are often inclined to prefer administrative posts to the 'field technician' appointments which are so essential for agricultural growth. It is here that salary scales become a factor and they should be determined by the requirements of growth rather than by any other consideration.[1]

In an expanding society educational guidance is not enough to ensure the adjustment of training to requirements. The fact is that a concomitant of growth is occupational reconversion made necessary by the adjustment of production to needs. There are still very few countries which have instituted 'reconversion training' available at any age. 'Intellectual investments in occupational changes' are characteristics of a society where the rate of growth is increasing.[2]

PROGRAMMING THE RECRUITMENT AND TRAINING OF TEACHERS

To cater for increasing numbers in school, teachers too are needed in increasing numbers. The shortage of teachers in the developing – and indeed in the advanced – countries is the main bottleneck in the development of schooling for agriculture. Determination of requirements in teachers is a fundamental aspect of programming. From experience or by constructing models, it is possible to determine the number of teacher 'man-job' necessary for the different types of training. These norms depend on the size of the establishment concerned, the specialization of the teachers, the number of hours taught per teacher, the programmes, etc.

For the developing countries, there is still a serious lack of such norms. Generally speaking, the number of pupils per teacher is lower in agricultural education than in other types. This is sometimes due to the nature of the instruction (amount of practical work), or to a smaller pupil intake or to the fact that teachers often take on other tasks notably in agricultural extension work.

As regards the second cycle of agricultural secondary education, a good approximation would seem to be a figure of about fifteen to twenty pupils per teacher and ten pupils per 'instructor' which we reckon is the technical personnel needed to run the practical instruction in the workshops and on the school farm. These norms are purely indicative and the figures must be calculated for each case individually.

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[1] This point of view has been vigorously defended by F. H. Harbison, R. Dumont and other economists. R. Dumont considers that a 'bush bonus' should be paid to 'field technicians'.

[2] L. Malassis, *Intellectual Investment in Agriculture for Economic and Social Development*, op. cit., Chapter VI, 'Economic Growth and Intellectual Investment in Training for Occupational Changes', p. 90 et seq.

The programming of the recruitment and training of teachers is directly related with the growth in numbers in school and with progress in teaching methods. In the absence of advance estimates (as also of means), there is a danger of forced recourse to accelerated training (which affects the quality) or of teacher shortages which put a brake on the expansion of education.

THE PROGRAMMING OF BUILDING OPERATIONS AND EQUIPMENT

Given the prospect of the rise in numbers in school, the question is how far existing establishments can be expanded, how many new establishments should be built, and their size, how they are to be built and where. From the schooling expansion plan and the stipulated minimum and optimum sizes for the various types of establishments (norms based on experience, on 'models', on international comparisons, etc.), the number of establishments required can be determined and a building and equipment plan drafted. The capital investment (accommodation plus equipment) should be calculated per type of training and per place to be made available rather than per pupil available, since it is possible that, for a while, only part of the establishment's training capacity will be in use.

A great many suggestions have already been put forward for reducing the cost of school building, including that of the contribution of the labour by villagers and pupils for the erection of simply constructed schools.[1]

REGIONAL PROGRAMMING: PLOTTING OF THE SCHOOL DISTRIBUTION MAP

The deployment of the teaching centres and hence that of teachers and laboratories and the distribution of pupils, that is, the plotting or more often the revision of the school distribution map are

[1] The capital per pupil sunk in agricultural education is generally very high; it remains high even when the capital expenditures specific to 'agricultural' education are deducted. The Unesco educational planning mission in the Ivory Coast calculated that capital cost per 'agricultural' pupil was higher than for any other form of secondary education.

effected according to the numbers of pupils anticipated. The location of teaching centres is determined in the light of a number of criteria of a demographic, ethnic, economic, political, etc. nature. In every case, distribution should be envisaged in the perspective of the establishment's maximum potential expansion, having regard to population density, the proportion of educands for the type of schooling under consideration, the extent of the recruitment area (distances to be covered, facilities for picking up pupils) and the size of establishment desirable educationally and economically.

The location of, and building priorities for, teaching centres may play an important part in regional equilibrium. Putting schools providing general and technical education in over-populated rural areas may help towards a better balance of population distribution while putting schools with an agricultural bias in particular zones helps the latter's development.

COSTING AGRICULTURAL EDUCATION AND PROGRAMMING ITS FINANCING

The total cost of schooling comprises the upkeep and amortization of accommodation and equipment plus current expenditure including the costs of staff and material (salaries, text-books, laboratory supplies, etc.) and, when requisite, pupils' maintenance costs (food, accommodation and health services); teachers' salaries are always the largest single item of expenditure. Professor Svennilson's formula is a handy means of calculating the over-all cost of schooling.

The developing countries are making a considerable financial effort on behalf of education (15 to 25 per cent of the budget in Africa). This arises more particularly from the fact that teachers, being relatively scarce, enjoy relatively high salaries. In the United States of America, a primary teacher's salary is less than 1.5 times the national *per capita* income (against 5 times the *per capita* income in Ghana, and seven times in Nigeria).[1] In Madagascar, a teacher's income is 10 times that of an average peasant, whereas in France a newly appointed teacher's income does not exceed 1.5 times the mean national *per capita* income.[2]

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[1] W. A. Lewis, op. cit., p. 740.

[2] IEDES, Paris.

If we know the educands S_1, S_2, S_n per type of agricultural schooling, the teacher-pupil ratio, salaries and the coefficients of the other expenditures, we have an adequate approximation of costs for programming purposes.

The cost of schooling per type of training having been established, the programming of its financing involves a break-down of the charges between the individuals concerned, the communities, the State and outside aid, in a ratio varying according to the systems used. From this, the appropriations of public money required and their spacing in time will be calculated.

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Conclusion

This publication is a tentative essay (cf., Introduction) and requires supplementing and amplifying in many particulars. From the practical point of view, it is particularly urgent to train specialists in the programming of rural education who, as members of teams of educators, statisticians, economists and sociologists, will share in the drafting of the programmes of education envisaged in connexion with over-all socio-economic development. The observations made by these teams and the construction of models will gradually make it possible to lay down 'reference norms', of which there is at present a serious lack, for the drafting of education plans.

The programmes for agricultural education and the handbooks which these involve have not been considered in the present work. The writer would suggest more particularly that Unesco take the initiative of preparing a handbook on 'rural development and global economic growth' designed to help the young of the developing countries to get a truer idea of the exigencies of socio-economic development and thereby to contribute to the struggle for a better way of life.

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